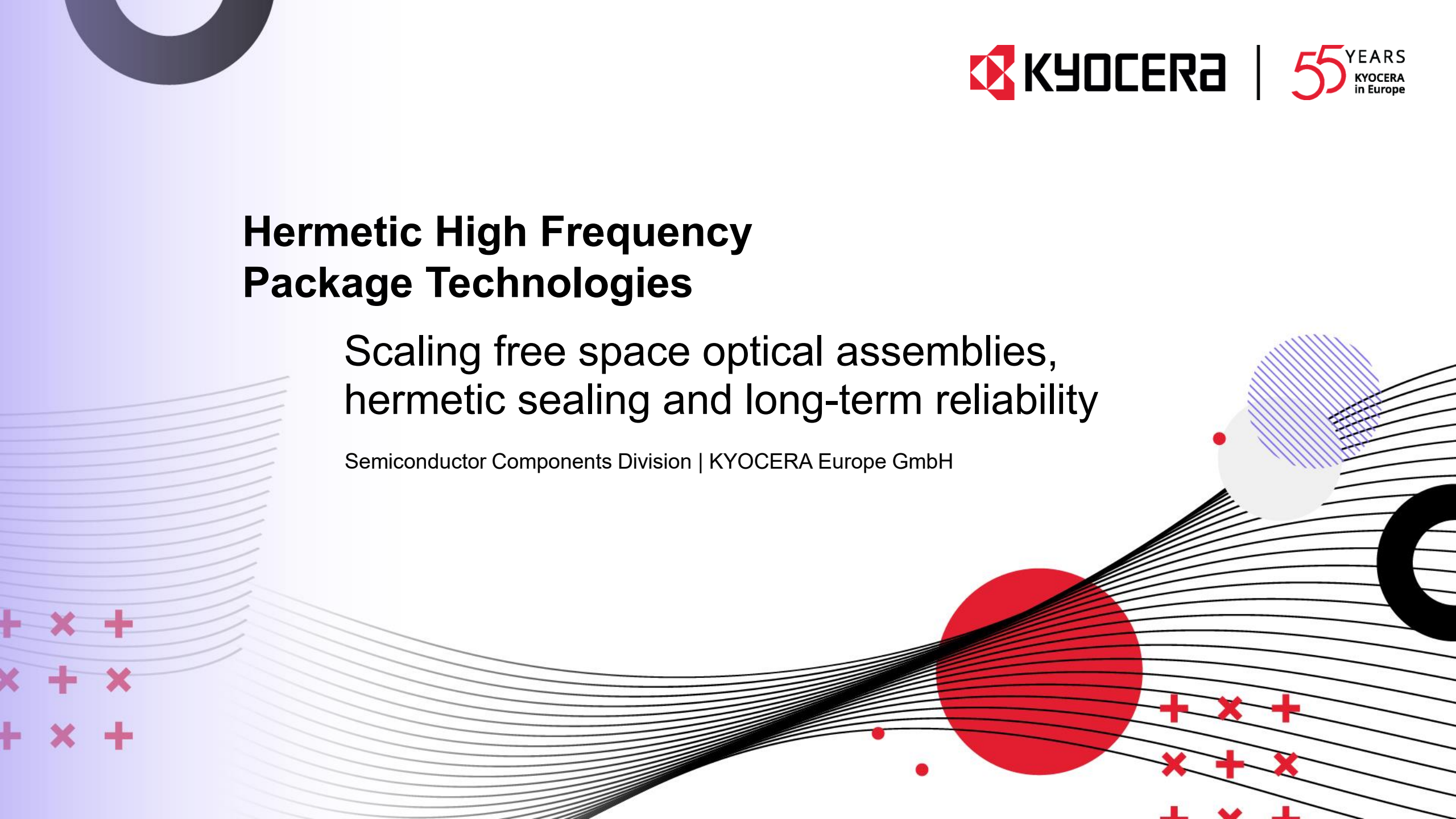


Hermetic High Frequency Package Technologies

Scaling free space optical assemblies,
hermetic sealing and long-term reliability

Semiconductor Components Division | KYOCERA Europe GmbH

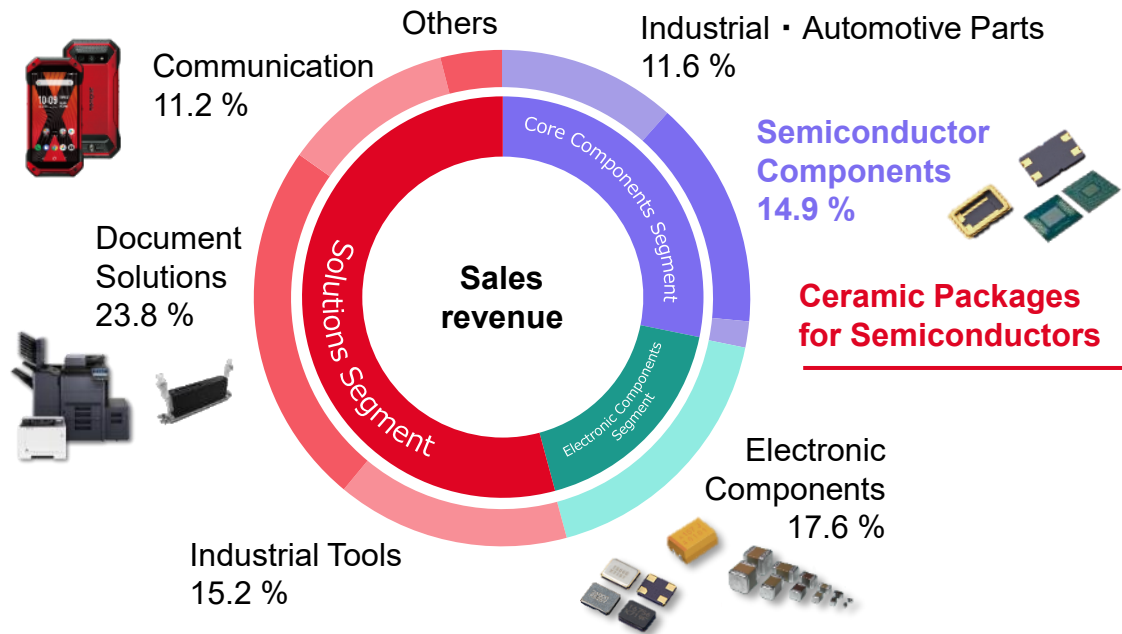


Corporate summary

Kyocera in a nutshell

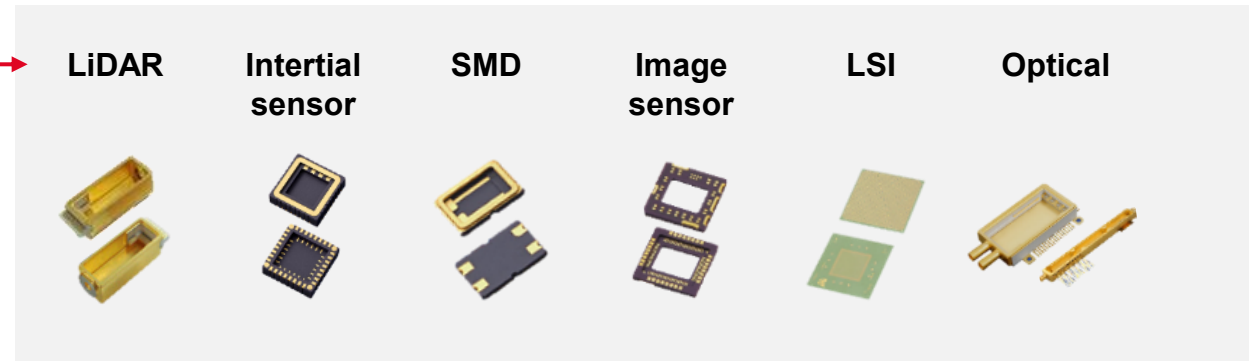


- ▶ One of the global leaders in advanced ceramic materials & packaging
- ▶ More than 6 decades of experience in semiconductor components
- ▶ Strong global manufacturing footprint & local European support
- ▶ Proven supplier from prototype to high-volume production



Semiconductor Components
14.9 %

Ceramic Packages for Semiconductors



KYOCERA
KYOTO CERAMICS

HQ
Kyoto, Japan
April 1, 1959

Corporate Motto:
"Respect the Divine and Love People"

~ 77,200 group employees*

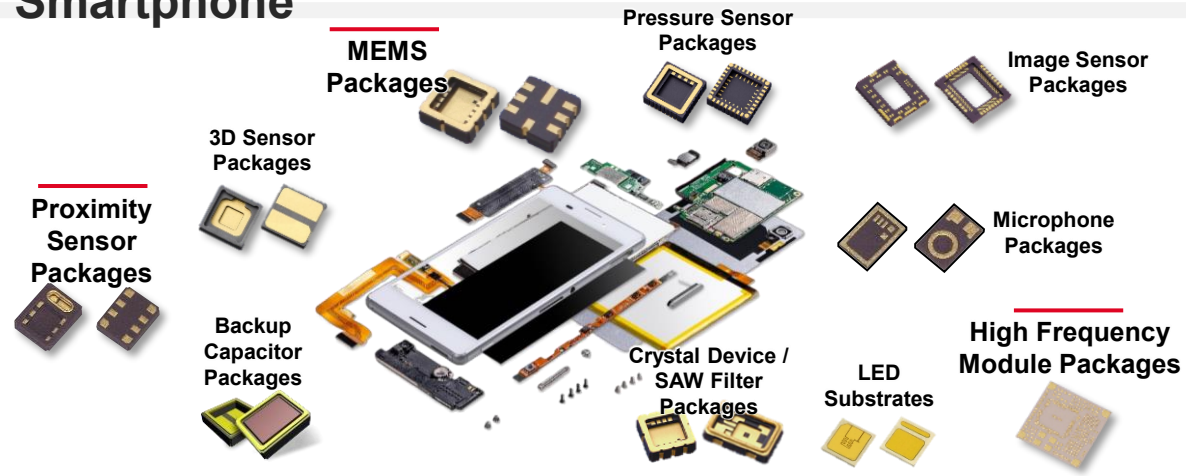
288 group companies*

115,703 million JPY capital

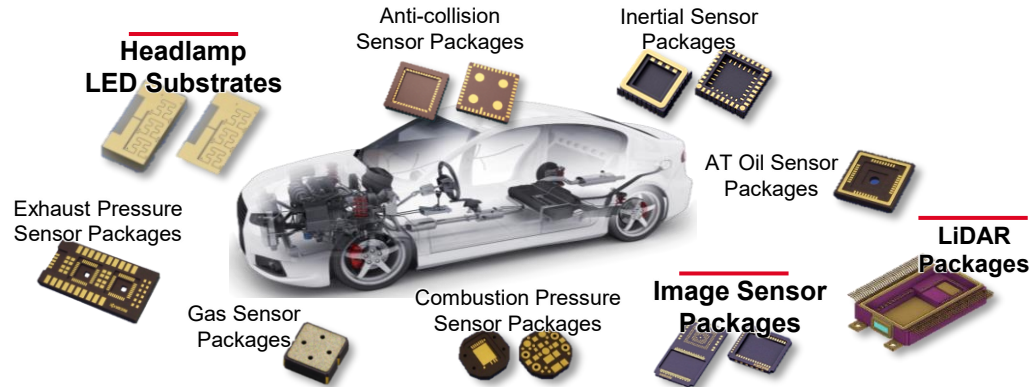
Core competence: high performance ceramics

*Total companies and employees as of March 31, 2025

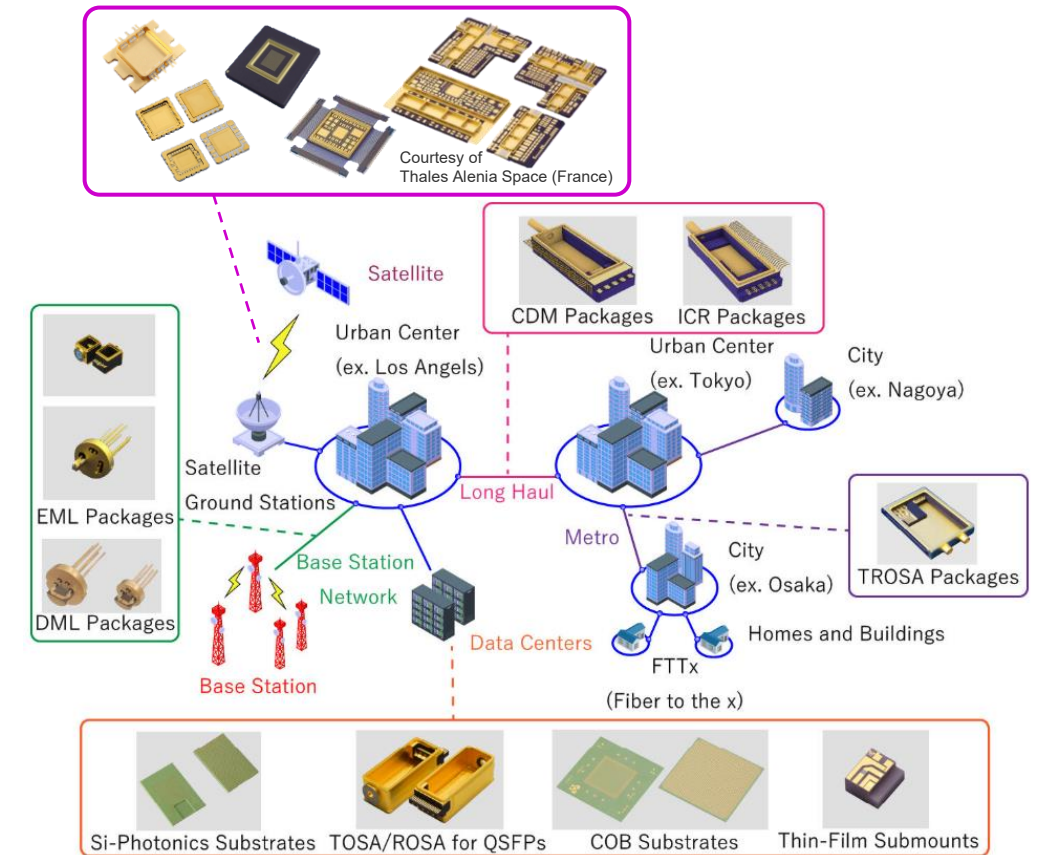
Smartphone



Automotive



Optical & Wireless Communications

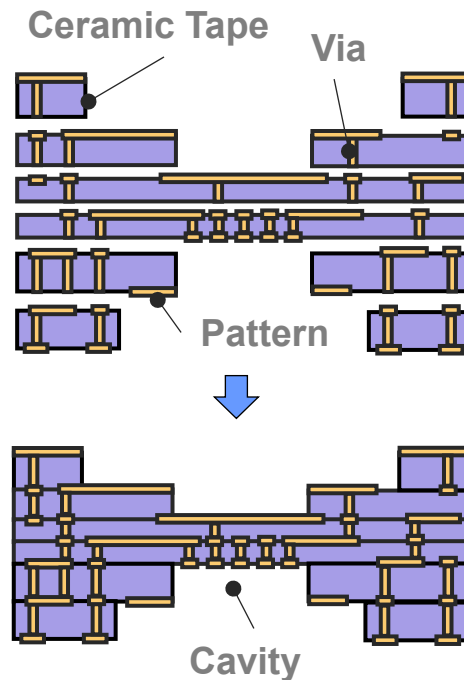


▶ Multi-Layer Ceramic Technologies

< Process Flow >

- ❖ Tape Casting
- ❖ Punching
- ❖ Via Filling
- ❖ Metallization Patterning
- ❖ **Lamination**
- ❖ Co-firing
- ❖ Ni/Au Plating

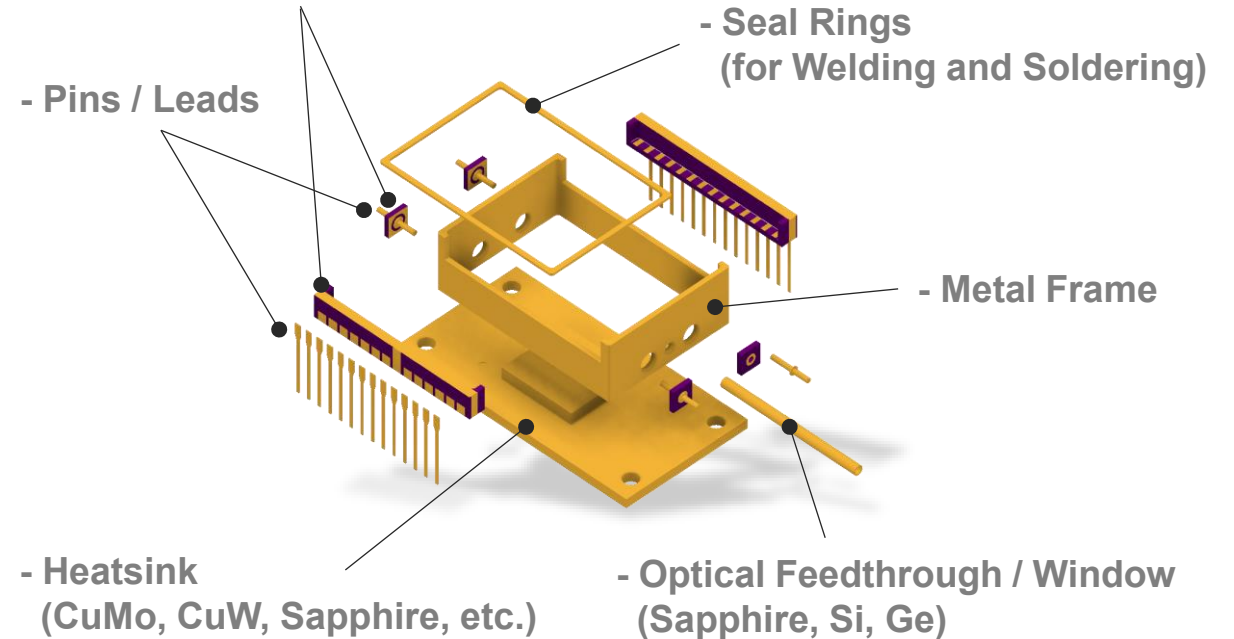
< Cross Section View >



Support for 3D Structures and 3D Routing

▶ Brazing Technologies

- Multi / Single-Layer Ceramics



- Coaxial Connector

- Waveguide, Waveguide Converter

- etc.

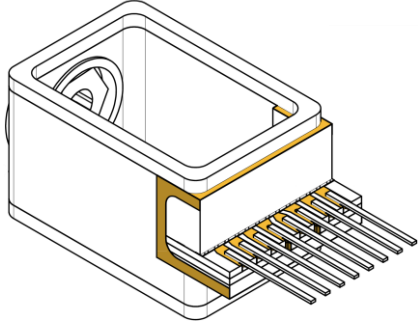
- Optical Lid

- RF absorber Lid

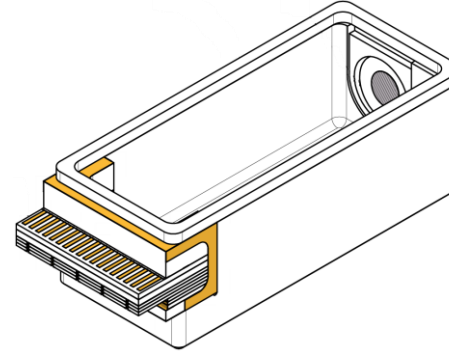
Hermetic Feedthrough Options For RF Signals



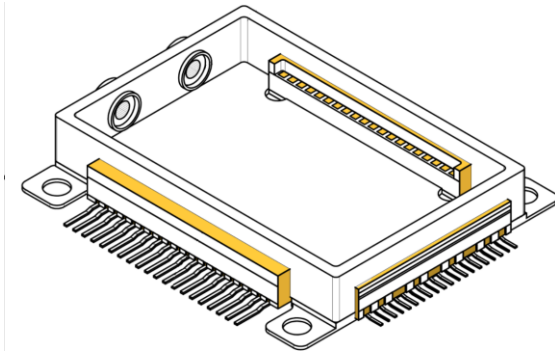
▶ Lead : ~30 GHz



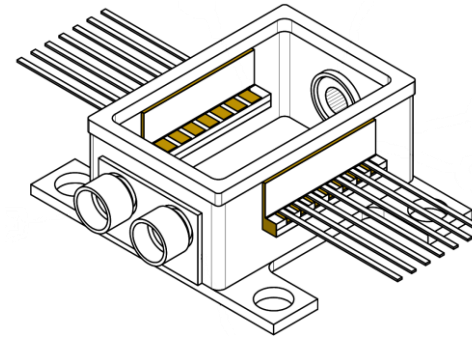
▶ FPC Soldering : ~140 GHz



▶ Surface-Mount Leads : ~70 GHz



▶ RF Connectors : ~145 GHz



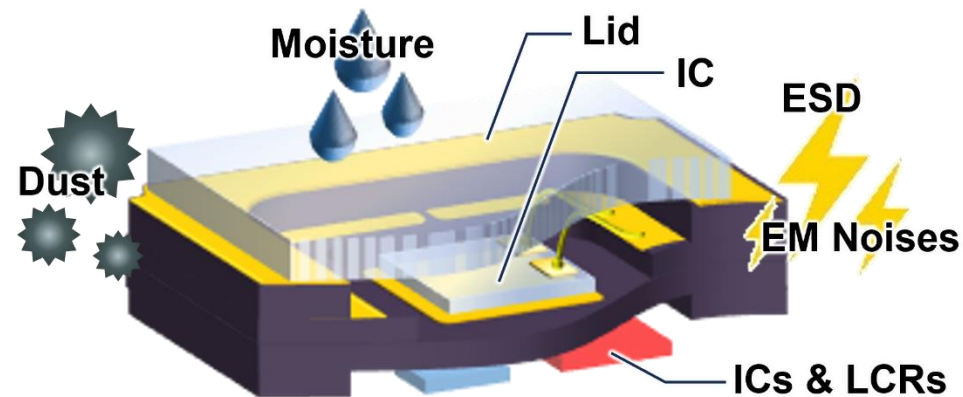
KYOCERA optimizes RF package designs based on your chip layout and assembly requirements.

► Proven Applications

- Optical Comms (Ultra-long-haul, Submarine, etc)
- Geostationary satellites and space probes
- Aircraft
- Automotive
- Oil drilling
- etc.

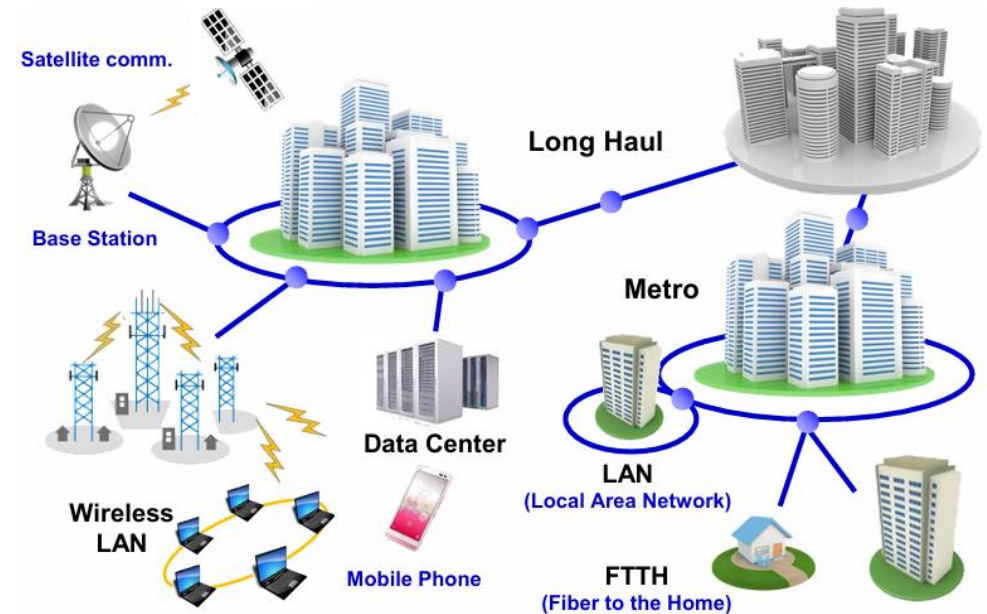
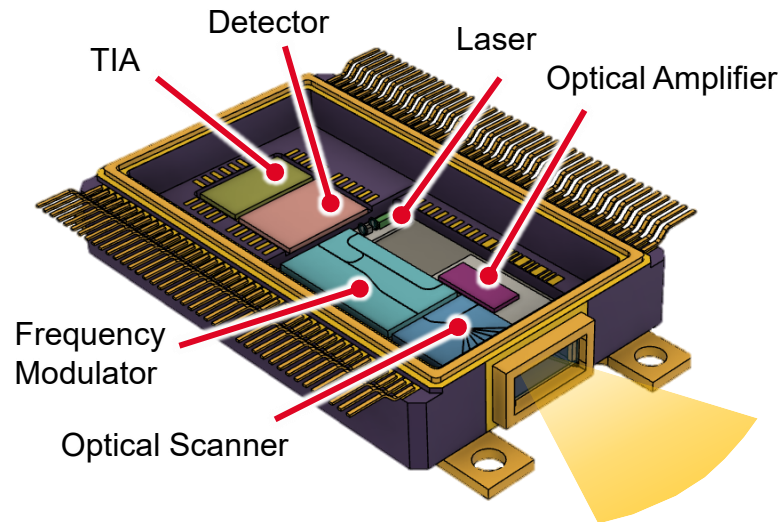
► Supported / Proven Standards & Qualifications

- Telcordia
- Various MIL-STD (TCT, Damp heat etc.)
- IATF
- Customer-specific reliability testing available



- ▶ Hermetic packages for lasers, modulators, detectors
- ▶ Optical windows, ports, and cavity structures
- ▶ High-frequency and thermal performance
- ▶ Support for integrated photonic modules
- ▶ High reliability packages
- ▶ From prototype to high volume production

Hermetic Package example
for Integrated Module Case for
Miniaturization & High Reliability



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Christian Märkle

Sales Engineer

+49 711 93934-961

+49 175 2904811

christian.maerkle@kyocera.de

KYOCERA Europe GmbH

www.kyocera.eu